Advanced Lighter Simulator Presentation

3 Feb 2000

Advanced Lighter Simulator

- Project Purpose
- Timeline and Status
- Overview

Advanced Lighter Simulator
Purpose

1. Provide a realistic simulation of causeway-based lighterage in a sea state 3 environment
2. Evaluate the effectiveness of new or modified lighterage technology
3. Evaluate lighterage simulation technology
4. 365 day/year training for Coxswains and Pilots

Advanced Lighter Simulator
Timeline of Events, Status Slide 1

- FY96 – Project Initiation
- April 97 – Requirements Analysis Completed
- June 97 – Initial System Design Completed
- FY 99 – Built SLWT Trainer, H/W & S/W Instance
- Aug 99 – Development Site Preview to PHIBCBTWO

Advanced Lighter Simulator
Timeline of Events, Status Slide 2

- Sep 99 – Limited Capability Simulator with SLWT Instance Installed at LittleCreek, VA PHIBCBTWO
- Feb 00 – PHIBCBTWO Begins Initial Useage
- FY 00-01 – Enhancements, Training Effectiveness, JMLS Variant/Instance, H/W & S/W Configuration Study, Re-host Analysis
- Status – System is currently down due to a hardware failure of main computer

Advanced Lighter Simulator
Analogy

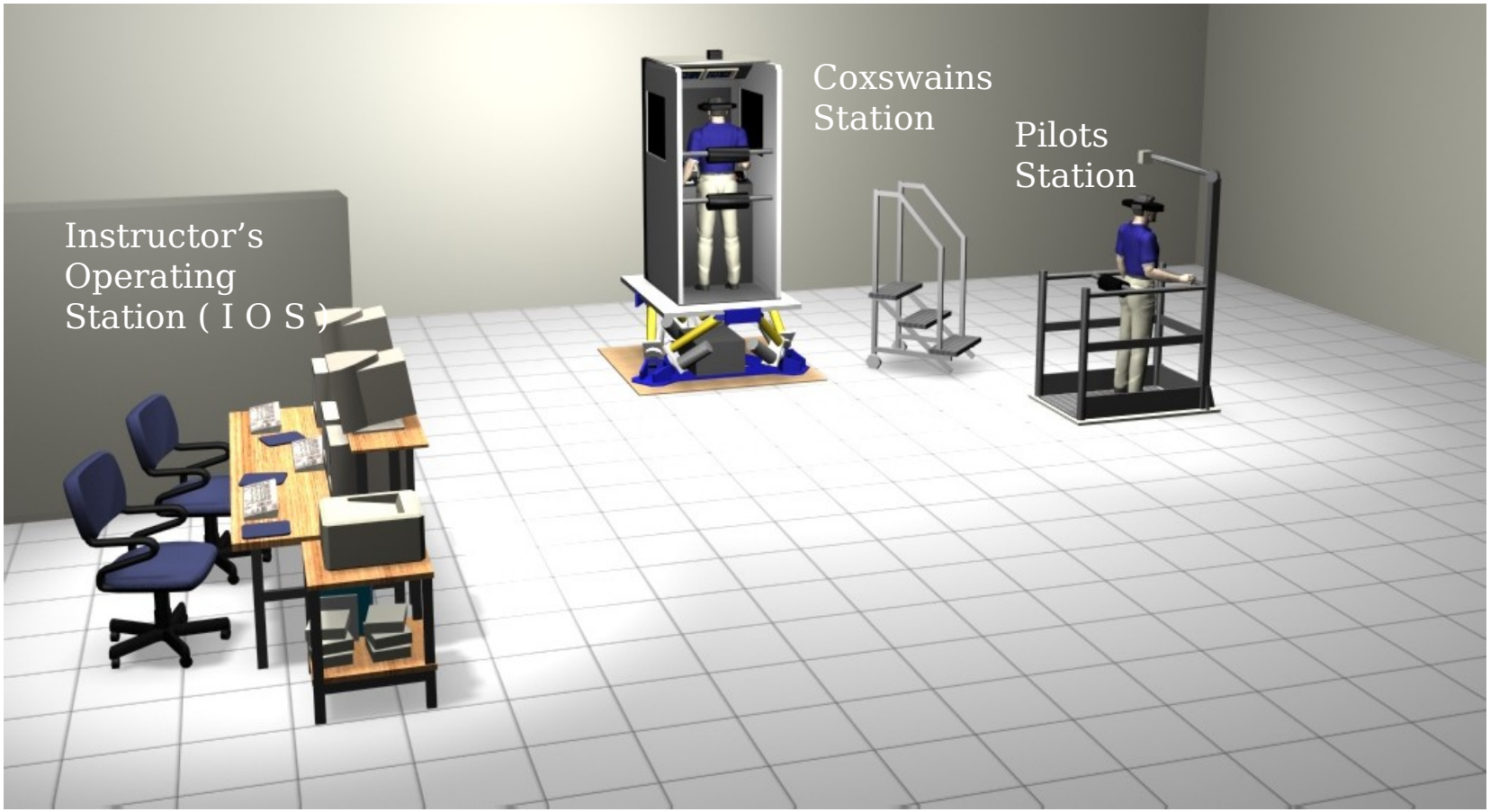
- Woodworker's Shop
  - Core Tools
    - Table Saw, Radial Saw, Routing Table
    - Hand Tools
    - Layout and Planning Tables, etc
  - Shop to House Tools and Project

The Advanced Lighter Simulator Project has provided a core set of tools to enable the simulation of instances such as SLWT Trainer, JMLS trainer and Design Evaluator, and small boats. Just as with woodworking, H/W name brands are not as important as their reliability, performance, and functionality.

Advanced Lighter Simulator
Hardware Overview

- Coxswain Station Mock-up
  - Navigation Aids, Engine and Craft Controls
  - Head Mounted Display (HMD)
  - Motion Base
- Pilot Station
  - Tracking System, HMD (360° Viewing)
  - Motion Base (optional), Joystick for simulated movement
- Instructor / Operator Station (IOS)
  - 2 Simulator Control Workstations with Graphics Displays
  - Hydro and Visual Simulation Workstation
  - Large Screen Monitor with Split Views
  - Personal Computer with Monitor for Controlling Motion Base

Advanced Lighter Simulator System Overview



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Advanced Lighter Simulator

View from Coxswain's Cab

Provide realistic simulation of entire lighter operating environment

including sea state 3 to evaluate simulator/trainer

3 FEB 2006

technology, support JMLS development and support NI

Instructor / Operator Station (IOS)

- Hydrodynamics & Visual Simulation Workstation
- Virtual Situation Workstation & Display (VSD)
- Simulator Control Workstation & Display (SCD)
- Personal Computer for Controlling Motion Base

Instructor / Operator Station (IOS) Hydro and Visual Simulation Workstation

- Runs Virtual Ship* Simulation & Training System (VSHIP®) Hydrodynamics Model
- Drives Coxswain and Pilot View Displays
- Drives Coxswain and Pilot HMDs
- “Talks” to all other computers

* Virtual Ship and VSHIP are trademarks of CSC / Advanced Marine

Instructor / Operator Station (IOS) Virtual Situation Display (VSD)

- Provides Visual Overview (bird's eye view) of scenario in which simulation exercise is being run
- Shows land masses, Traffic ships, Ownship
- Shows Navigation Aids
- Can Zoom In/Out
- Can Move Window of Viewing [left, right, up, down]
- Can Display freeze-frame view of ownship icon
- Can introduce & control traffic ships
- Displays and records ownship data (coordinates, heading, speed, etc)
- Allows Instructor / Operator to re-position ownship

Instructor / Operator Station (IOS) Simulator Control Display (SCD)

- Displays ownship status (location, heading, speed, etc)
- Displays Simulation Duration
- Allows toggle between bridge mode and Instructor Mode
- Allows Instructor to freeze simulation
- Displays environmental, visual, mooring, traffic ships, alarms, failures, malfunctions, sounds, etc parameters and conditions
- Allows Instructor to select one of eight pre-defined SLWT configurations
- Allows Instructor to introduce failures or warning conditions

Playing GOD via SCD Environment Control Window

- Visibility by time of day, by distance, by weather conditions
- Weather (clear, haze, fog, rain)
- Depth of water
- Current speed and direction
- Wind speed and direction
- Wave height and direction
- Introduce sounds (traffic ships, seagulls, rain volume, thunder volume and frequency)

Simulation Exercise

- Typically a pre-defined scenario is selected
- Can change scenario on the fly
- Can save scenarios for later selection

Coxswain Station
Slide 1

- Duplicates controls & Visuals of SLWT
- Overhead & console mounted touch screens
- Ship control console
  - Port and starboard throttle and clutch levers
  - Port and starboard water jet direction joysticks
  - Center levers are “backup” joysticks
  - Alarms and whistle display panel

Coxswain Station
Slide 2

- Command Information Display for ship control
  - Heading, Speed, Rate of turn
  - Rudder Angle, Propeller RPM
  - Water depth
  - Wind speed and direction

SLWT Instance
Slide 1

- Used Core Tools (e.g. VSHIP® Simulation)
- Built coxswain & pilot stations
- Duplicated controls and visuals of existing SLWT
- Instrumented an SLWT to capture motion data for hydro model
- Introduced a pilot station with motion capturing, HMD, motion base capable
- Allowed coxswain to see pilot as an avatar in HMD

SLWT Instance
Slide 2

- Built 8 pre-defined CSP + CSNP + Loading configurations
  - Single Section [load/draft, no load] [min sail, max sail]
  - .
  - .
  - Multiple section (CSP+3CSNP) [load/no load] [min sail, max sail]

  Max sail = 4 ISO containers for CSP, 6 for CSNP

  Max draft = 1 M1A1 tank (60LT) for CSP, 2 for CSNP

  Max sail + Max draft = 4 ISOs (20LT ea) for CSP
  6 ISOs for CSNP

SLWT Instance
Slide 3

- Considerations for pre-defined lighter configurations
  - Basic skills training
  - Basic skills training for long craft
  - Flexing practice
  - Ship approaches, beaching

Summary

The Advanced Lighter Simulator is a core set of tools that allows the Navy to build small craft trainers and evaluators. Trainers such as the powered causeway trainer in LittleCreek, VA allow the Navy to train 12 months a year, in conditions usually not available in the real world, and review the results in a classroom setting.

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